(No Model.)

4 Sheets—Sheet 1.

A. J. BODEN.

FIRE ESCAPE LADDER.

No. 478,559. Patented July 12, 1892.

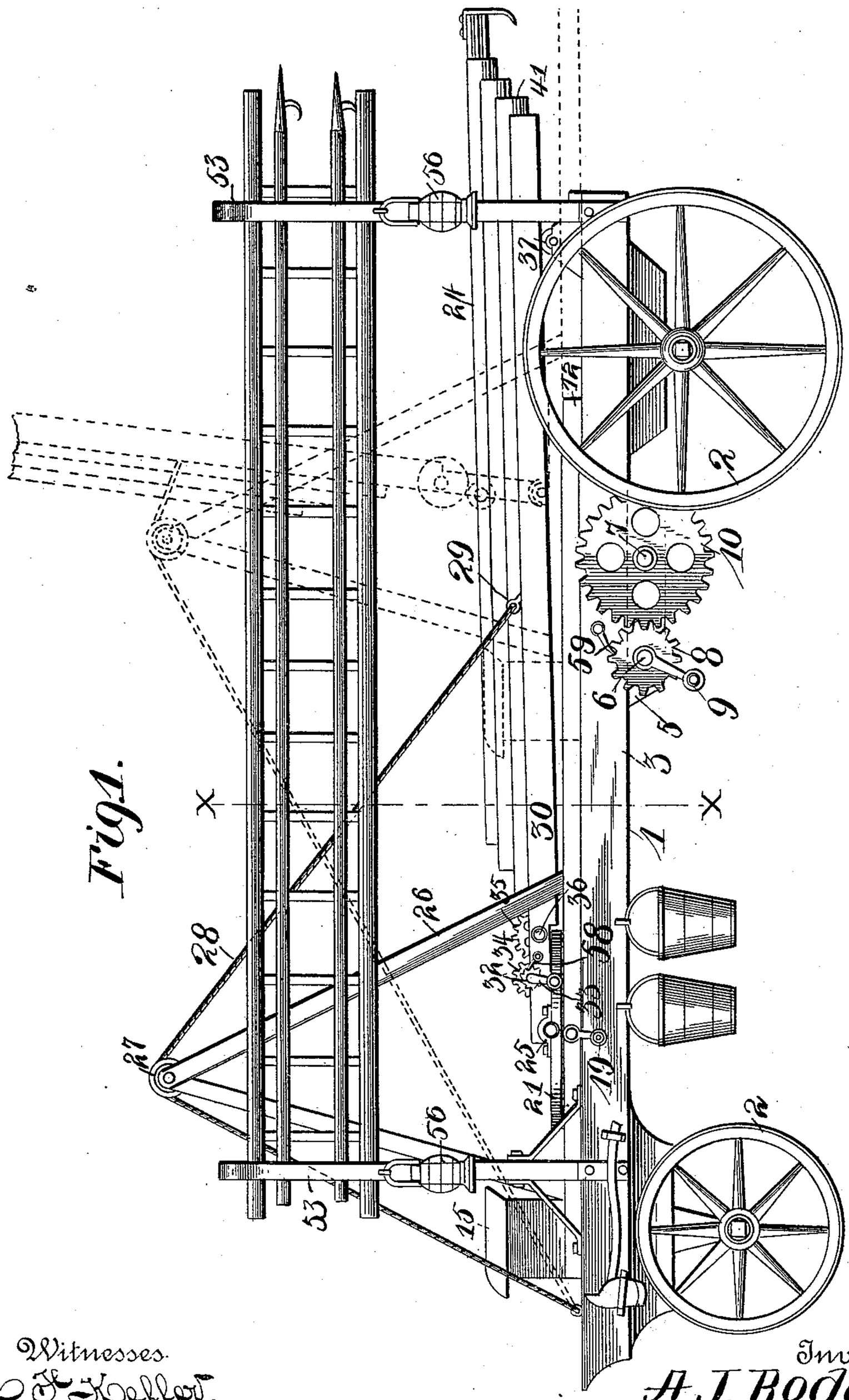

Fig 1.

Witnesses.
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(No Model.)

4 Sheets—Sheet 2.

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FIRE ESCAPE LADDER.

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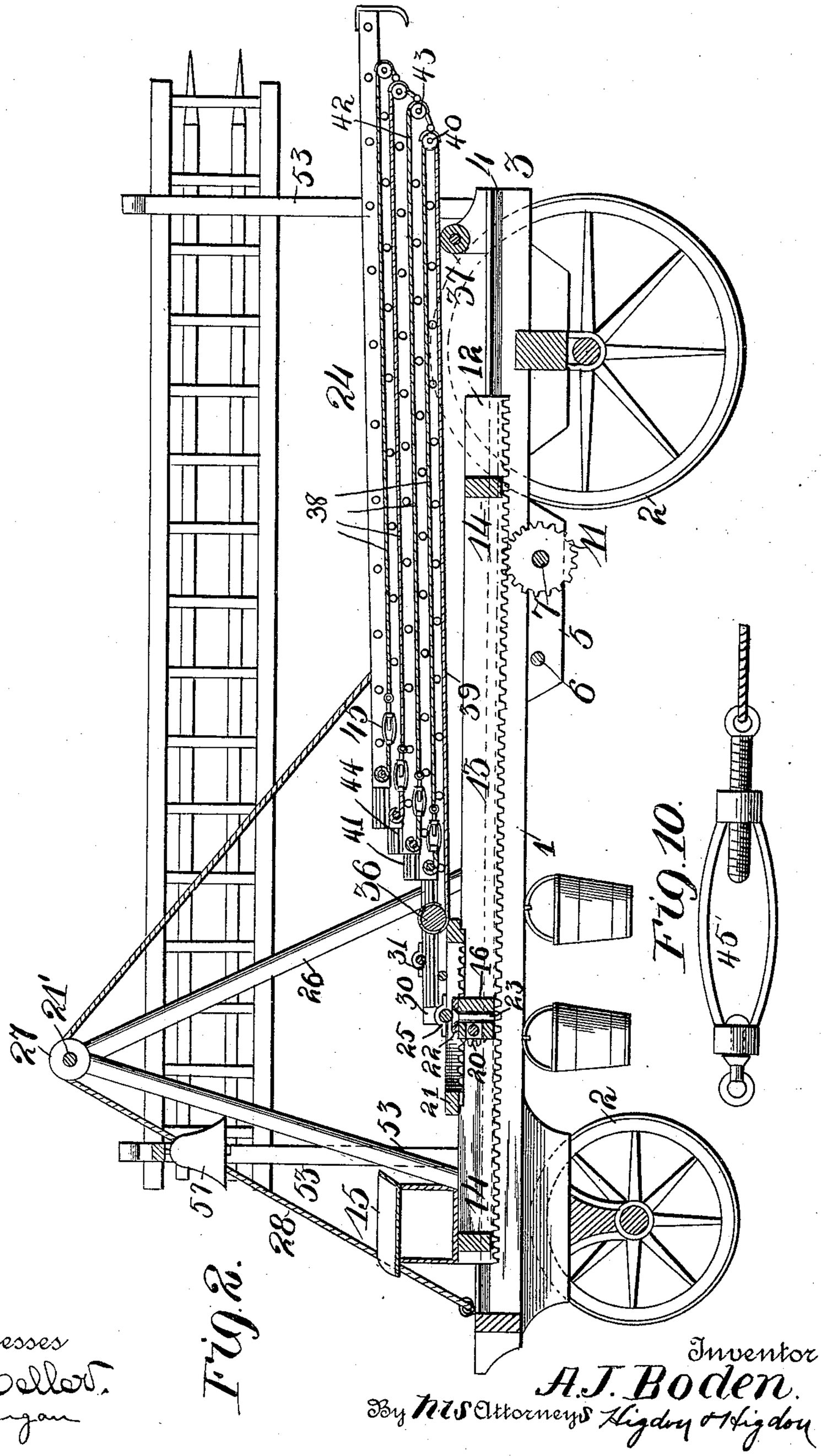

Fig. 2.

Fig. 10.

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(No Model.) 4 Sheets—Sheet 3.

A. J. BODEN.

FIRE ESCAPE LADDER.

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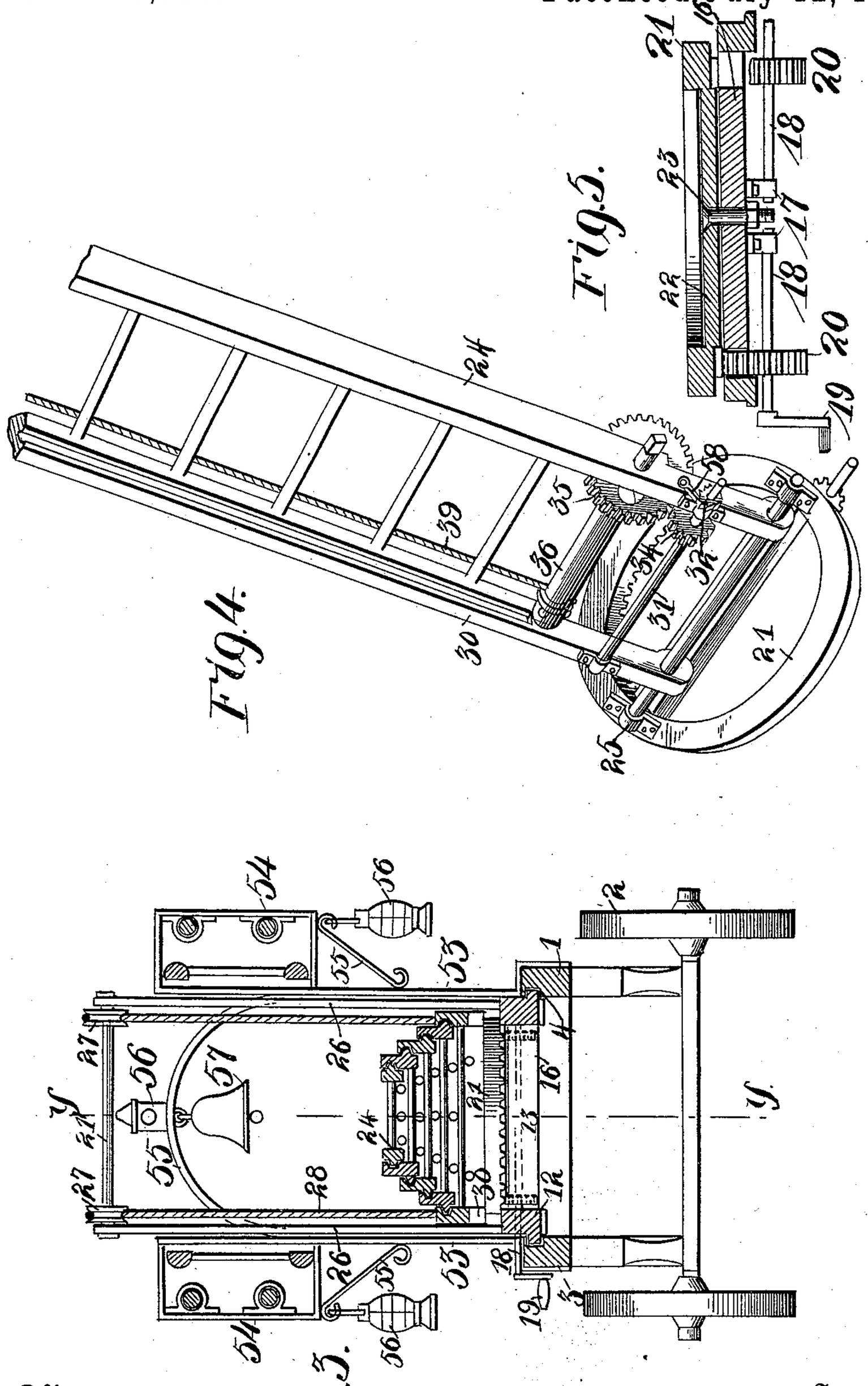

Witnesses
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(No Model.)

4 Sheets—Sheet 4.

A. J. BODEN.

FIRE ESCAPE LADDER.

No. 478,559. Patented July 12, 1892.

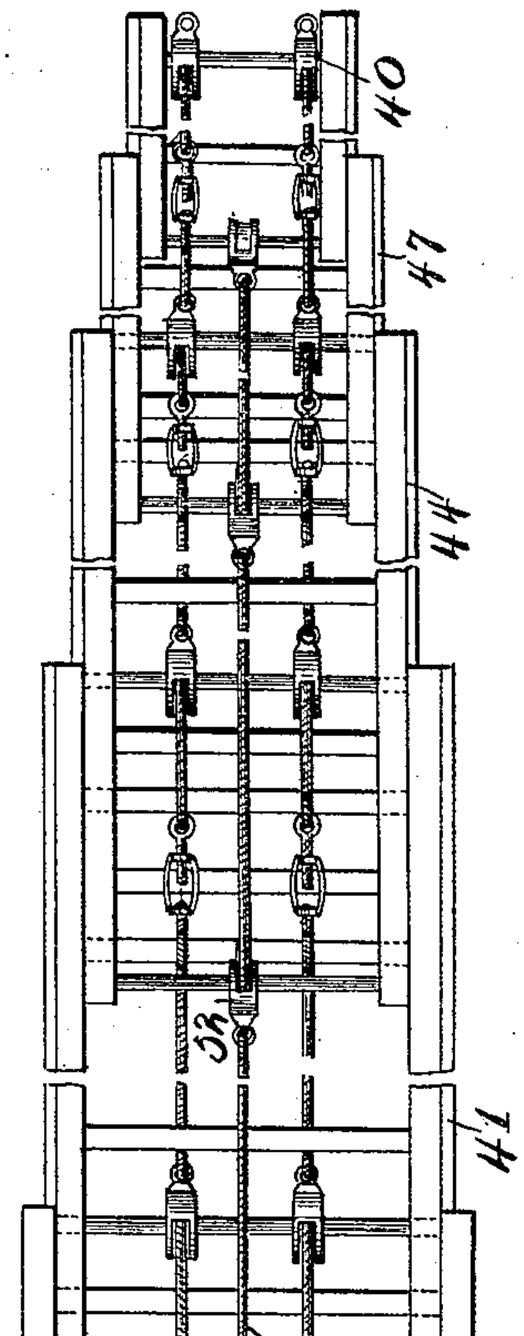

Fig. 6.

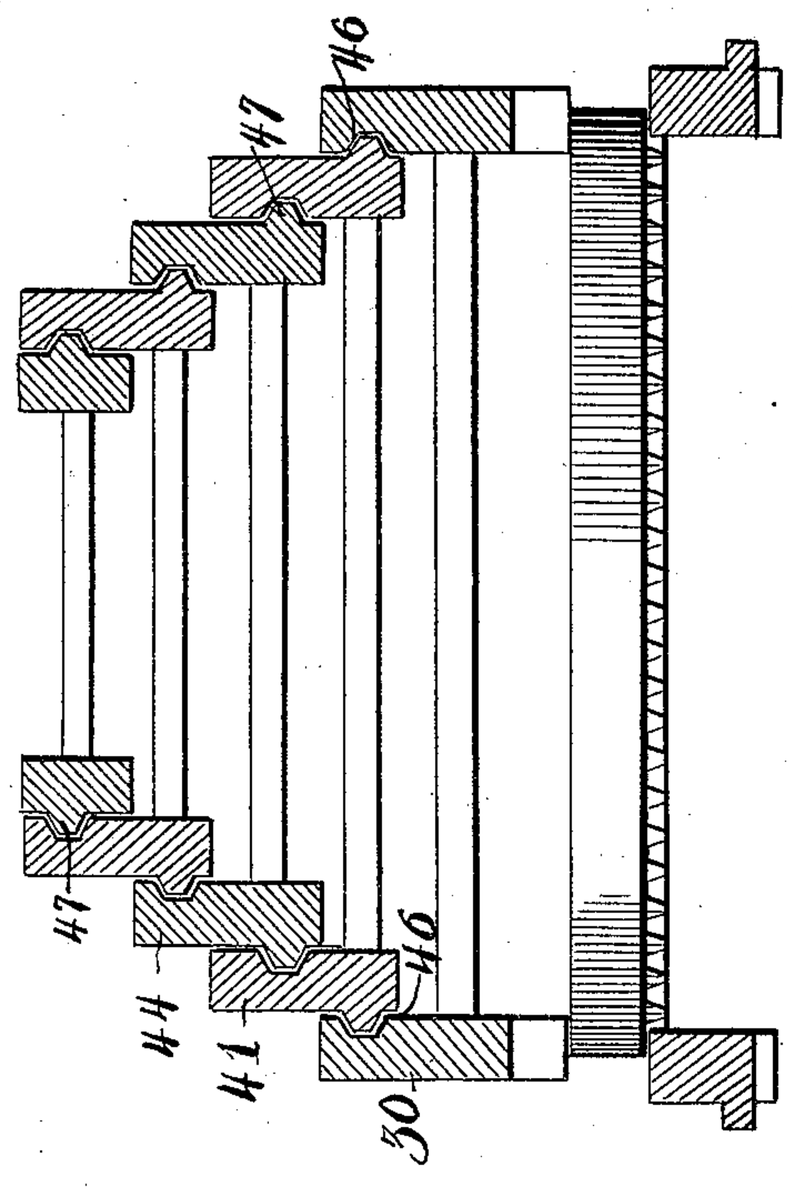

Fig. 8.

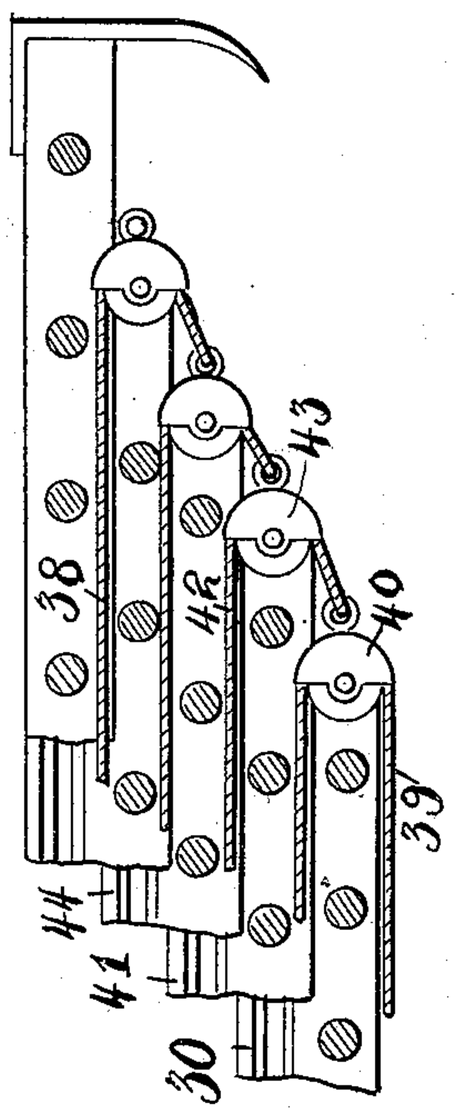

Fig. 7.

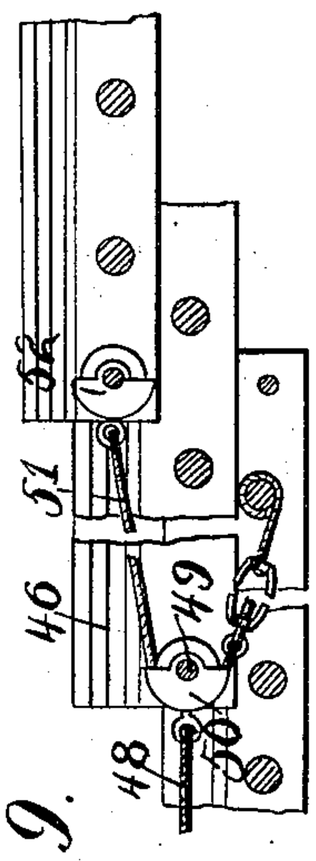

Fig. 9.

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UNITED STATES PATENT OFFICE.

AUGUST J. BODEN, OF LITCHFIELD, ILLINOIS.

FIRE-ESCAPE LADDER.

SPECIFICATION forming part of Letters Patent No. 478,559, dated July 12, 1892.

Application filed January 16, 1892. Serial No. 418,343. (No model.)

To all whom it may concern:

Be it known that I, AUGUST J. BODEN, of the city of Litchfield, in the county of Montgomery and State of Illinois, have invented certain new and useful Improvements in Fire-Escape Ladders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in fire-escape ladders; and it consists in the novel arrangement and combination of parts, as will be more fully hereinafter described, and designated in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention as it would appear before the same is operated in any manner, showing in dotted lines the position the ladders will assume when the device is operated. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a vertical transverse section taken on the line *x x* of Fig. 1. Fig. 4 is a perspective view showing the revolving base upon which the ladders are mounted. Fig. 5 is a vertical longitudinal transverse section taken through the said base and its operating mechanism. Fig. 6 is a top plan view of the ladders detached from the remaining portion of the invention. Fig. 7 is a vertical longitudinal section through one end of the ladder, showing the arrangement of the ropes and showing their connections to the said ladders. Fig. 8 is a vertical transverse section taken through the ladders and the truck-frame, showing more especially the construction of said ladders. Fig. 9 is a vertical longitudinal section showing in detail the ropes connecting the same for lowering the said ladders, and Fig. 10 is a side elevation of an adjusting device for the ropes.

The objects of my invention are to construct a practical fire-escape which can be conveniently carried upon a suitable truck from place to place and simple and improved means whereby the said ladders may be elevated to a suitable angle, and by additional mechanisms the said ladders can be lengthened, reaching to any desired height upon the building to which the said fire-escape is adapted to be brought in contact.

My invention further consists in providing novel means whereby the said ladders may be revolved before or after the same have been lengthened, whereby the said ladders may be conveniently used notwithstanding the position of the truck for supporting the same.

Referring to the drawings, 1 represents a truck-frame of suitable size and dimensions to accommodate itself for the remaining parts of the device, and said truck-frame is suitably mounted upon wheels 2, by means of which the same can be moved from place to place.

3 represents the side beams of the said truck, each of which is provided with inner longitudinal grooves 4, which receive a suitable tongue formed upon the carriage, as will be hereinafter more fully described. To the lower edges of the side beams 3 of the truck-frame are secured two bearings 5, which provide means for supporting the operating-shafts 6 and 7. The shaft 6 extends a little beyond one of the bearings 5, and rigidly secured to said projecting end is a pinion 8, and also secured to said shaft in any mechanical manner is a crank 9, by means of which the said shaft is revolved, and consequently said pinion. The shaft 7 also extends in a similar manner beyond one of the bearings 5, and keyed to said end of the said shaft is a gear-wheel 10, the teeth of which mesh with the teeth formed on the pinion 8, so that when the said pinion is rotated the said gear-wheel 10 will also be rotated or turned.

Secured to the shaft 7, between the bearings 5, are two gear-wheels 11, the teeth of which mesh with the two rack-bars formed with or attached to the lower edge of the side beams 12 of the carriage 13.

By the construction of the gearing and the arrangement of the parts as above described the crank 9, when turned, will move the carriage 13 in either direction, as may be desired. The carriage 13 is also composed of transverse pieces 14, the ends of which unite with the sides of the said carriage, whereby the said carriage is made rigid, which is absolutely necessary, a better illustration of which can be had by referring to Fig. 2. Upon the forward end of the said carriage is secured a seat 15, upon which the driver sits for controlling the horses attached to the said fire-escape.

16 represents a transverse piece, which is secured between the side pieces 12 of the carriage intermediate of the said transverse pieces 14 of the said carriage, upon which the ladders, or, more properly, the base portion of the same, are mounted and form a support for the same.

Referring more especially to Fig. 5, 17 represent two bearings, which are secured to the under surface of the cross-piece 16 about the median portion of the same, which bearings receive one of two short shafts 18. The opposite ends of said shafts pass through the side beams 12 of the carriage, forming bearings for the said shafts at that point, and rigidly secured to the said ends are hand-cranks 19, by means of which the said shafts are turned. Mounted upon and secured rigidly to each shaft 18 is a cog-wheel 20, the teeth of which mesh with radially-arranged cog-teeth formed on the under surface of the revolving ring or plate 21. When either of the hand-cranks 19 is turned, motion will be imparted to one of the cog-wheels 20, and consequently revolve the ring 21. The ring 21 is provided with a horizontal cross-piece 22, and through said piece a bolt 23 passes, said bolt also passing through the cross-piece 16, which holds the said ring in its proper position and location to the carriage and yet permits the same to be revolved when necessary.

24 represents a series of sliding ladders, the top one being smaller than the remaining, and each diminishing in width, as better shown in Fig. 8. The lower of said ladders is movably secured at its ends to the revolving plate or ring 21 by means of bearings 25, which form a movable connection between said ladder and ring, permitting the said ladders to be elevated at a suitable incline when the carriage 13 is moved in the direction as shown in dotted lines in Fig. 1.

26 represents standards, which are preferably four in number and are arranged in pairs, the upper end of each pair uniting, forming bearings for the shaft 21′, and the lower ends of said supports secured rigidly to the sides of the carriage 13.

Upon the shaft 21, are mounted two rollers 27 adjacent to the bearings formed by said supports, over which rollers the rope 28 is adapted to move. One end of said rope 28 is secured at any suitable position to the lower ladder by means of a screw-eye or other suitable device 29, and the opposite end of said rope is similarly attached to the truck-frame of the vehicle.

By the construction as above described the carriage 13 when moved rearward will elevate the ladders, as shown in dotted lines in Fig. 1.

30 represents the lower ladder, which is provided with the mechanism for elevating the remaining ladders, the construction of which mechanism I shall now proceed to describe.

31 represents a shaft, which is mounted in the sides of the said lower ladder 30, and secured upon said shaft is a ratchet-wheel 32 and also a crank 33, by means of which the said shaft is revolved. Also mounted upon said shaft is a gear-wheel 34, which gear meshes with a similar gear 35, mounted upon a second shaft 36. Around the shaft 36 the rope for operating remaining ladders is wound when motion is imparted to the crank 33.

37 represents a roller, which is mounted in suitable bearings, which bearings are secured to the upper edges of the longitudinal beams 3 of the truck-frame, said roller supporting the ladders at that end and upon which the lower of said ladders is adapted to move when the carriage 13 is moved.

38 represents the ropes, which are preferably constructed of wire and are four in number, which ropes are adapted to elevate the movable ladders when motion is imparted by the crank 33.

39 represents the lower of said ropes, one end of which is secured to the shaft 36 and the said rope passed through a suitable pulley 40 and the opposite end secured to the lower rung of the ladder 41. To the pulley 40 is secured one end of a rope 42 and said rope passed through a second pulley 43 and the opposite end of said rope secured to the lower rung of the ladder 44 and the remaining ladders and ropes similarly attached.

From the foregoing description, and referring particularly to Figs. 2 and 7, it will be seen that the rope 39, on being wound upon the shaft 36, will cause the rope 42 to be pulled nearer the said shaft, elevating the second ladder 41, and so on.

Each of the ropes above referred to are provided with adjusting devices 45, whereby all slack can be taken out of said ropes or said ropes lengthened, as may be desired.

Referring more particularly to the construction of the ladders which I employ, 46 represents V-shaped grooves, which are formed in the sides of each of the ladders, and 47 V-shaped tongues, which are adapted to work in said grooves whereby the ladders are held together and prevented from getting out of their proper position in relation to one another, reference being had to Fig. 8 of the drawings.

In order to permit the ladders to slide freely when lowered, I employ additional ropes, as shown in Figs. 6 and 9 of the drawings.

48 represents a rope, one end of which is secured to the shaft 36, but is so arranged upon said shaft that it will wind upon the said shaft in an opposite direction to the ropes previously described, and secured to the rung 49 of the adjacent ladder is a pulley 50, to which pulley the opposite end of said rope 48 is attached. Around said pulley 50 a second rope 51 is adapted to pass, one end of which rope is secured to a second pulley 52, secured to the lower rung of the adjacent ladder 44 and the opposite end of said rope secured to one of the rungs of the lower lad-

der 30 and the remaining ropes attached and arranged in a similar manner to the remaining ladders.

53 represents vertical uprights, the lower ends of which are secured to the truck-frame and the upper ends of said supports terminating into suitable brackets 54, within which are placed detachable ladders and other devices commonly employed.

55 represents a third brace, the ends of which are secured to the supports 53 and upon which brace a suitable lamp 56 is mounted, and below said lamp and attached to said brace is an ordinary bell 57, which is commonly employed in fire-escapes of this character.

In order to hold the ladder in an elevated position, the pawl 58 is allowed to come in contact with the ratchet-wheel 32, thereby preventing the shaft 36 from rotating, and in order to hold the ladders in a proper incline, as shown in dotted lines, Fig. 1, the pawl 59 is allowed to come in engagement with the pinion 8, locking the said pinion against rotation.

When it is desired to use the ladder, the crank 9 is first turned and the ladders are elevated at an incline, as shown in dotted lines in Fig. 1. After the ladders have been caused to assume the position as above stated the crank 33 is turned, which causes the ladders to be elevated, reaching the desired height upon the building.

Where there is but little room to work the device, and more especially where the truck cannot be turned for the want of room, the cranks 19 are turned, causing the ladders to be revolved or assume such a position against the building as may be desired.

Having fully described my invention, what I claim is—

1. In a fire-escape ladder, the combination, with a truck, of a carriage movable thereon, a series of extensible ladders, the lower one of which being pivotally and revolubly mounted on said carriage, a support mounted on the carriage in advance of the ladders, and a rope passing over said support and attached at its respective ends to the truck and ladders, substantially as and for the purpose set forth.

2. A fire-escape ladder consisting of a truck-frame, a carriage movable upon the same and provided with rack-bars, a shaft, such as 7, provided with gear-wheels 11, which are adapted to mesh with the said rack-bars for moving said carriage, a revolving plate, such as 21, mounted upon said carriage and provided with gear-teeth, pinions adapted to mesh with said teeth for revolving said plate, a series of ladders, one of which is movably mounted upon said plate, a cord or rope, such as 28, one end of which is secured to the said ladders and the opposite end to the truck-frame, supports, such as 26, carried by the said carriage and supporting suitable rollers 27, over which the said ropes are adapted to run, and means whereby the said ladders are moved upon one another and simultaneously, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST J. BODEN.

Witnesses:
EDW. E. LONGAN,
C. F. KELLER.